Scientific American.

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THE
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☞See advertisement on last page.

Poetry.

OUR OWN FIRESIDE.

Our own fire-side's easy chair—
Is there any place beside
Where such pleasant cheer we share?
Where the hours so gently glide?
Though but humble be the fare
That Want's daily toils provide,
Dainty's cup can ne'er compare
With the joy that sparkles there,
By our own fire-side.

Would you meet with genuine Mirth
Where she comes a willing guest?
'Tis the quiet social hearth,
Well I wot, she loveth best;
Where the little ones at play,
Prattle by their mother's side,
And the elder, mildly gay,
Laugh and sing the hours away
By their own fire-side.

An honest man, though poor,
Yet may feel an honest pride,
While he tells his troubles o'er
Where his heart hath not to hide,
He who falls from high estate
No great grievance hath to bide,
If he calmly meets his fate,
Where content and quiet wait
By the rustic fire-side.

They who love us till we die,
Who through troubles have been tried,
Who will watch the closing eye
When all grows cold beside—
Where shall friends like these be found,
Search we earth and ocean wide
Where, on all this weary round,
Save that hallowed spot of ground
Called our own fire-side?

In my chimney's cozy nook
Thus I chant my rustic lay,
'Neath the rafters brown with smoke,
Curling up for many a day.
Wealth may boast his splendid hall,
Pomp and luxury and pride,
Sculptured roof and pictured wall—
There's no comfort in them all
Like my own fire-side.

GOD HELP US TO THE LAST.

Lag not the oar when skies are clear,
Nor leave the trusty helm;
We cannot tell how fierce and near
Are blasts to overwhelm.

Though dark the night to watchful eyes
The stars will never fail;
And clouds when morning lights the skies
Bring tidings of the gale.

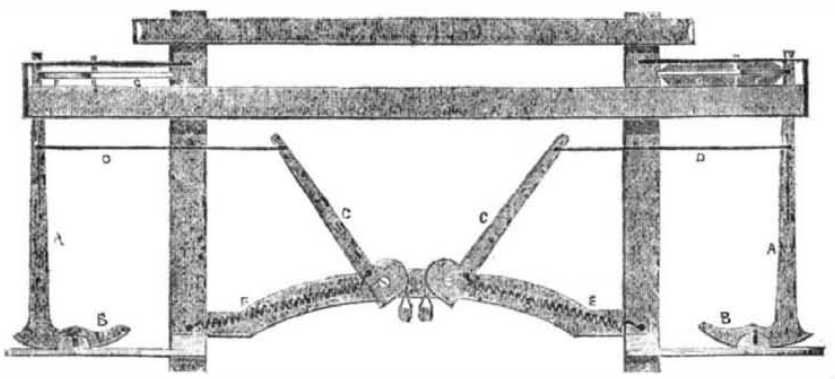
The calm should ne'er be idly spent,
While sleep the threat'ning seas,
Trim up the sails the storm has rent,
And fling them to the breeze.

The tide is not an even tide,
Though smooth the track behind—
O'er which our venturous shallops glide
Before the sweeping wind.

With trusty hearts through night and day,
Till rock and shoal are past,
Keep "wait and watch," and ever pray
God help us to the last.

BARNUM'S IMPROVEMENTS ON THE POWER LOOM.

Figure 1.



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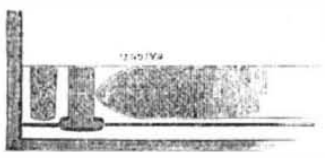
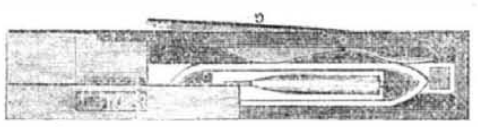


Figure 3.



This is the invention of Daniel Barnum, the inventor of several steam engine improvements and particularly of the Safety Guage, referred to in our last number. He now resides in this city, where further information can be obtained by letter.

Description —Fig. 1, is a front view of a part of a loom showing the race beam, the shuttle boxes, the picker staffs and the wag staffs. Fig. 2, is a top view of one of the shuttle boxes, showing a spring which is attached to the protection guard for the purpose of arresting the momentum of the shuttle and the shuttle acting against said spring. A A, are the picker staffs, which are each sustained on a rocker B, to cause the motion of its upper end in a right line. C C, are the wag staffs, D D, being the rods by which they are connected to the picker staffs. E E, are spiral springs by which the wag staffs are drawn back when relieved from the action of the treadles, leaving the shuttle box free for the entrance of the shuttle without the obstruction of a picker; the treadles to be depressed by means of a cam in the ordinary way. No pickers are employed in the shuttle boxes, but the heads of the picker staffs are capped with picker leather or other suitable substance at their upper ends which are brought directly in contact with the shuttles. To arrest the momentum of the shuttles an additional spring is attached to the inside of the protection guard, as shown at F, Fig. 2, and when the shuttle comes into contact with the swell G, of the guard and forces it out so as to act on the protection, the spring F is at the same time forced inwards and arrests the shuttle so as to prevent its striking against the end of the box with such force as would cause it to rebound; for as the additional spring is on one side and the swell of the protection on the other side of the fulcrum the shuttle is pressed against the back of the box by the action of the spring upon the protection guard, and the rebounding is consequently effectually prevented. By the manner of combining and operating the wag staffs and picker staffs and combining them with each other and with the treadles, the friction of the apparatus is much less than under other constructions, there is greater certainty of the action of the shuttle and the apparatus is rendered more durable than heretofore

Fig. 3, is intended to represent the shuttle box fitted with the ordinary race rod and picker H, with the picker staff behind it, as seen at A. Under this arrangement the rocker B is dispensed with and the bottom of the staff is placed upon a stud, the other connection being the same as above described. This motion is less expensive in its application to looms in use than the other and may by some be preferred.

The nature of these improvements is the manner of arranging and combining the apparatus concerned in the arresting of the momentum, and in the throwing of the shuttle also the particular manner of combining the treadles, the wag staffs and the picker staffs with each other to co-operate in producing the required motion as set forth.

The Jarra Tree.

This extraordinary timber grows to a size that would appear incredible. It is perhaps only manageable and remunerative from 50 to 60 feet, but in some of the districts of Africa it is found growing 120 and 150 feet in height before the first branch appears. Lander and his servant took refuge once from a storm in the hollow of an old Jarra tree, which not only sheltered themselves, but their horses, and the interior actually measured in diameter three times the length of the largest horse, an animal sixteen hands high and very long backed. The same parties found a Jarra tree. which had fallen completely across a broad and deep river, (called the Deep River) running between high and precipitous banks, thus forming a natural bridge, along which a bullock cart might have passed.

The highest peak of the Rocky Mountains is 12,500 feet, and James' peak is 12,000.

Human Nature.

After the battle of Culloden, a reward of thirty thousand pounds was offered to any one who would deliver up the young Pretender. He had then taken refuge with the Kennedys, two common thieves, who had protected him with fidelity, and robbed for his support. A considerable time afterwards, one of these men, who had resisted the temptation of thirty thousand pounds for a breach of fidelity, was hanged for stealing a cow valued at thirty shillings.

Benefit of Cleanliness.

A London Goldsmith saves $200 dollars a year, by the gold and silver in the sediment of the water tanks in which the workmen are required to wash before leaving the premises. The workmen have clean hands and their employers make a clean penny.

Fifteen hundred houses have been built in this city since May last.

RAIL ROAD NEWS.

Western Atlantic Railroad.

The State of Georgia has issued proposals for contracts for the completion of the Western and Atlantic Railroad, viz; from Chattanooga to Dalton, on the Tennessee river, 38 miles. This is the last link in the chain between the Atlantic at two points, viz: Savannah and Charleston and the Valley of the Tennessee. From the point where the road strikes the Tennessee river, is about 100 miles steamboat navigation to Knoxville, and about 500 miles to the Ohio river. The passage over the Muscle Shoals, however, can only be effected when the river is high. It is a shame that the canal around those shoals has never been completed.

Champlain and Connecticut River Railroad.

From the report of the directors of the Champlain and Connecticut River (Rutland and Burlington) Railroad, we learn that the division of the road extending from Burlington to Brandon, Vt. (51 miles) is under contract and in process of construction, with the prospect of being completed during the present year. The grading and masonry on the part of the line extending from Bellows Falls to (and including) the summit of Mt. Holly, is also under contract and in progress. The whole line, therefore, with some slight exception is now under contract—as the directors state, on favorable terms, and with a confident expectation that 90 miles of it will be in readiness for the cars by the first of January 1849.

New Road in Connecticut.

The citizens of Hartford, Conn. have subscribed the sum of $610,000, towards the construction of a railroad from that city to Willimantic, and thence to Providence, to intersect with the contemplated railroad from New London to Springfield. This road will pass through the heart of Eastern Connecticut.

Cohoes and Albany Railroad.

A bill to incorporate a company for the construction of the Albany and Cohoes railroad, is now pending in the Senate, and will undoubtedly receive the favorable consideration of that body. The Commissioners are the richest men in Albany county. The capital stock which is to be divided into shares of $50 each, is to be $250,000.

The Newark Advertiser states that A. G. Hecrote has patented a new mode of connecting cars by which they are easily coupled by one man and in case of accident they are uncoupled themselves. It is said to be impossible for one car running off the track to drag others after it. The "coupling" is so constructed, that on the slightest deviation beyond the regular curve of the track, the connection between the erratic car and others is instantly severed.

The Rail Road Bridge which fell a short time since at Athol, Vermont, was constructed with cast iron nuts for an experiment. It is a conclusive one.

Contracts for the first twenty-five miles of the Chicago and Galena Railroad have been entered into. The whole distance is about 160 miles

Arkansas Lead Ore.

Mines of lead have been discovered in Arkansas and the ore on being analyzed was found to be worth $70 per ton, for the silver alone which it contains. It may therefore be regarded as the Argentine ore of lead. The ore, then, instead of being smelted in the ordinary way, should undergo the process of cupellation to extract first the silver, and the residum would be nearly as valuable as if it had undergone the process of smelting.

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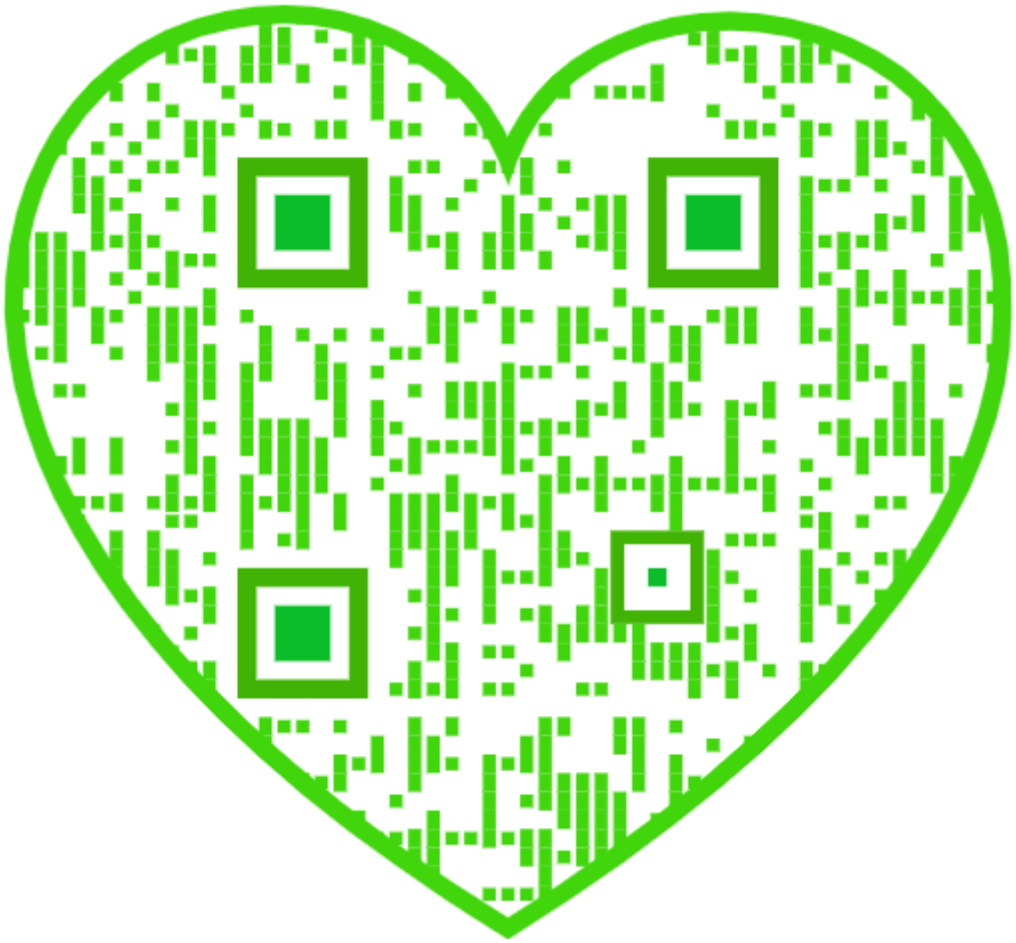

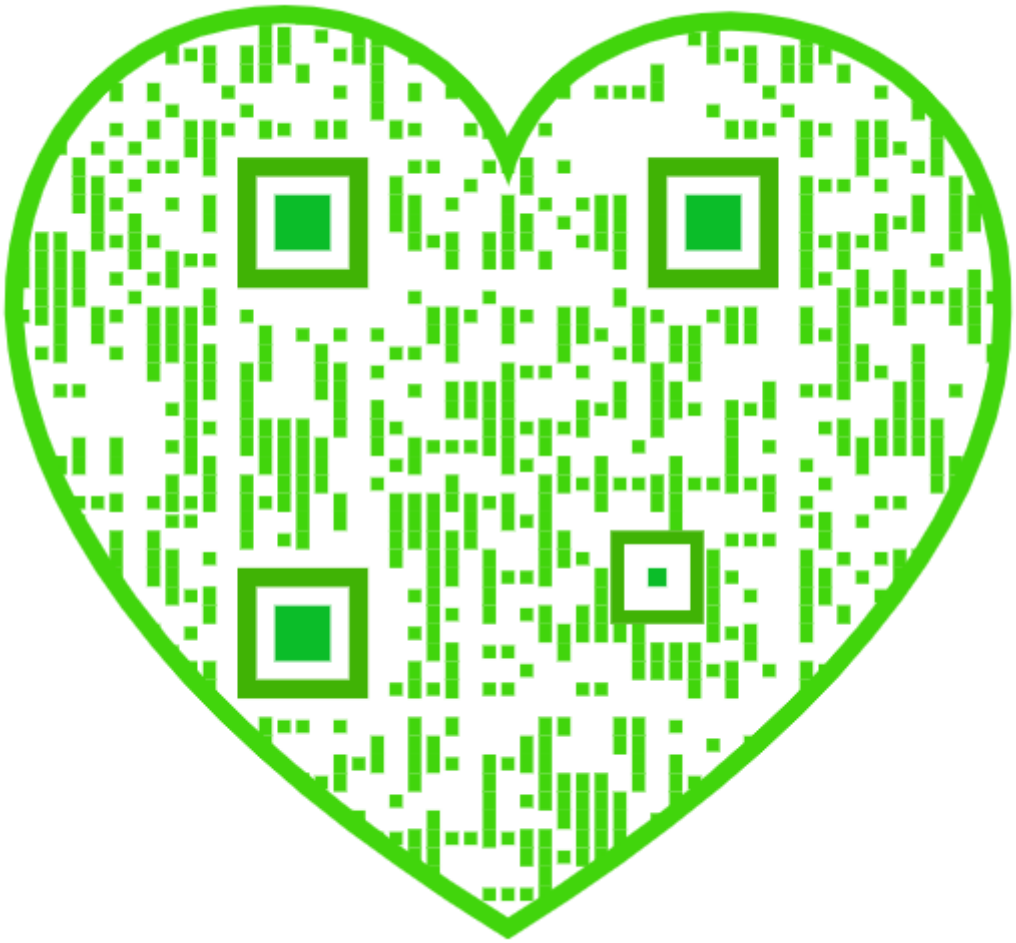

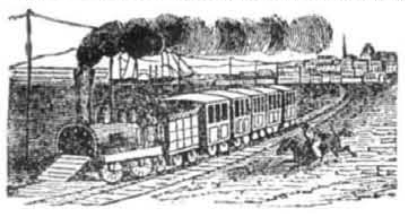

Sugar.

We are indebted to the Hon. J. A. Dix, U. S. Senator, for the Report of the Secretary of the Treasury, communicating the investigations relative to the chemical nature of saccharine substances and the art of manufacturing Sugar, made under the direction of Professors A. D. Bache and R. L. McCulloch.

We have examined the Report with much interest. It shows to us that our government amid many conflicting elements, has not forgotten the natural resources of the country.

This investigation was well timed and justly demanded. The fine, fertile flat bottoms, as they are called, of our Southern States, can raise sugar cane unsurpassed by any other nation. Yet the cultivation of Beet Root and the manufacture of Sugar from it, have been so improved by scientific inquiry in Europe, that much danger is to be apprehended to cane sugar in competition with it. All the light then that can be thrown upon this subject—this now important, necessary article of our existence, for the improving its manufacture, is particularly demanded at the present time. We are glad to learn that numbers of our Southern gentlemen have gone scientifically into the business, and have adopted the vacuum process of refining in preference to the old mode. The use and consumption of sugar is daily spreading and increasing. In fact its consumption is now a test of the comparative comfort of the people of almost every country and it is therefore a subject of interest to every man.

Artificial Stones.

Having in a previous number of the Scientific American alluded to this discovery, we have been favored with a description of the process from the late proceedings of the British Institution of Civil Engineers, as explained by Mr. F. Ransom, the inventor. It consists in broken pieces of flint subjected for some time to the action of caustic alkali, boiling under the pressure of a close vessel, when a transparent silicated solution is formed, evaporated to 1600 gravity. It is then mixed with proportions of well washed sand, broken granite and other materials, as may be selected for hardness. This paste is then pressed into moulds and subjected to a red heat in a stove or kiln by which operation the uncombined silica of the raw materials, uniting with the excess of alkali of the solution forms a semi vitreous compound—an artificial stone—perfectly insoluble. Capitals, shafts, mouldings and various other articles of decorative art are made from it.

Locomotion.

A new treble-wheeled carriage expected to travel on common roads at the rate of ten miles an hour, by the light, simple, and pleasant labor of a tread-wheel attached to machinery in the interior, and capable of carrying twelve persons at this rate, from thirty to forty miles by one driver, without fatigue, is at present being exhibited in model at Liverpool.—*Ex.*

It is not new. Such carriages were used on some of the roads in Scotland in 1844, but an explosion put an end to the enterprise.

Military Execution.

A soldier, a Scottsman, named Victor Galbraith, a bugler of Capt. Mier's Cavalry was lately shot at Buena Vista for threatening the life of his captain. An eye witness says "he calmly sat down upon his coffin and would not allow them to bandage his eyes but told the men to take good aim. He was the most resolute man I ever saw."

New Acid.

An English paper states that Dr. Sheridan Muspratt has succeeded in producing two very remarkable acids from the sulphocyenides o ethyle and methyle. This discovery is already appreciated on this continent, where Dr. Muspratt has for some years ranked as one of the first of British chemists.

LITERARY NOTICES.

Universal History.

"An Universal History of the most remarkable events of all Nations," is the title of a new work published by W. H. Graham, Tribune Buildings, New York. Volume 1 is to be a complete ancient history, comprised in 4 numbers, 25 cents each. The plan on which it is got up is different from any other work. It is a history of man as he came forth at the plastic call of his Creator, and man in all his different conditions. It is a valuable work.

The Art of Memory.

The third edition of this valuable and able work, by Pliney Miles, has just been published by Wiley & Putnam, No. 161 Broadway. To those who wish to acquire an artificial memory, this work presents peculiar claims, not only on account of the ability which the author has displayed in the arrangement, but because of the importance of the subject. A good memory is one of the greatest of God's blessings.

Holden's Dollar Magazine.

No. 3 of this able and cheap Magazine has been issued, and we cannot but speak well of its matter and manner. The first of a series of Pulpit Sketches is commenced. Dr. Potts, the able and eloquent pastor of University Place Presbyterian Church in this city, is the subject. This Magazine presents no ordinary attractions to subscribers.

The History of the Bottle.

Oliver and Brother, publishers of the Organ, have just issued a very excellent work with the above title, illustrated with eight engravings, as originally published in their paper. We commend it to all, especially the friends of temperance. Office 89 Nassau St., up stairs.

Explosions in Steam Boilers.

We are indebted to J. Pickering, Esq., of Cincinnati, author of the "Workingman's Political Economy," for the Report of the Cincinnati Committee appointed to examine into the causes of the explosion of the steamboat A. N. Johnson.

We are also indebted to E. C. Delevan, Esq. for Professor Stewart's able letters to Dr. Nott on the Scriptural view of the Wine question.

We are also indebted to Bishop Doane, of New Jersey, for a copy of his address before the New Jersey Historical Society, and an eloquent address it is.

Gigantic Project.

The British Government are building a canal of great capacity, from the mountains in which the Ganges rises, down into the country seven hundred miles, at an expense of fifty millions of dollars, for the purpose of irrigating the land.

Famines often occur in India from the excessive droughts no rain sometimes falling for six months while there are hot winds which destroy all vegetation.

This canal is to prevent such famines.

Wholesale Desertion of Wives and Families.

Recently, the Parochial authorities of St. Luke's, Chelsea, and St. Leonard's, Shoreditch, London, issued descriptions and rewards for the apprehension of 54 men charged with deserting their wives and families, leaving no fewer than 217 individuals a burthen to those parishes. The men are described as good mechanics, and able to earn from 26 to 30s, per week.

Adulterated Flour.

The Kingston Whig, Canada, states that for some time past the Kingston Market has been glutted with adulterated flour. The adulteration chiefly consists in mixing Rye with Wheaten Flour.

Temperance Railroads.

The stockholders of the Fall River, (Mass.) Railroad, resolved, with only one dissenting voice, that no spirituous liquors be transported over the road.

The Police system of this city costs annually about $500,000. A new plan is now under discussion in the Common Council, which proposes to reduce the annual expenditure to $300,000, and it presents a yet more efficient system.

Monster Engines.

The British Great Western Company Railroad, a short time since, placed upon their road, a monster engine, called the "Iron Duke," of thirty-six tons weight. It was found to work so well, that the Company have ordered sixteen more locomotives of about the same gigantic dimensions—a portion of them to be furnished with eight-foot driving wheel These collossal iron "horses" will draw a thousand tons over the ordinary grades of that road with perfect ease. They are of about double the average size of the engines now employed upon the roads of this country.

From the important improvements which are continually made in the construction of locomotives, it would almost seem as if there were no limit to the progress or capacity of railroads; or, at least, if there is any such limit, that it has not yet been discovered.

Astronomical Phenomenon

By recent discoveries at the National Obser vatory Washington City, and other places, it has been ascertained that the sun has decreased in volume nearly one-tenth, and this singular phenomenon has occurred entirely within the past month. The change took place suddenly, since, acccording to the accurate observations on the morning of the 18th ult, it presented its usual volume to the vision of the spectator, yet, as it arose on the next day, the alteration was easily perceptible to the naked eye! Its form, too, is altered. Its latitude has decreased while its longitude has been prolonged.

The above we have noticed in a number of exchanges and consider it to be a most singular phenomenon, but a more remarkable still, will be to find any person who believes it, at least, as it reads to the *mis*understanding.

Lumber Business in Gardiner.

In Gardiner and Pittstown, Maine, the total amount of log lumber is 20824 m; Shingles, 16,303 m; Clapboards, 1,905 m; Laths, 4040 m. The amount of money recived for sales on the above lumber is $445,000. The logs cost in Gardiner about three fifths of that amount, leaving the amount of $178,000 for profits and expenses of manufacturing Well done Gardiner.

New Plant.

A plant indigenous to California, called *chancalagia*, has been lately introduced into the Southern States. It is regarded by the Mexicans and Californians as a panacea for all evils and distempers to which they may be exposed. Its efficacy in curing diseases has been well tested.

Sabbath Convention.

A Covention of Delegates from the Counties of Franklin, Perry, Adams and Dauphin, Pa., to take into consideration such measures as might best promote the proper observance of the Sabbath, met in the Borough of Chambersburg on the 28th of January. Frederick C. Smith of Chambersburgh presided, and the Convention was addressed by Rev. O. S. Powell. A long series of Resolutions was adapted, asserting that the law of God, and the physical and moral well-being of man require the observance of the Sabbath.

When to Speak and When Not.

"I have known," says Cicero, "many sins by speaking, few by keeping silence;" it is therefore more difficult to know how to be silent than to speak. And there is a Spanish proverb to the same effect; "Any fool may babble, but it takes the wise man to hold his tongue."

Pay and Overpay.

A correspodent of the Oxford Chronicle points out somewhat of a descrepancy in the payment of Christian Ministers—the curate of his parish for forty years' exemplary labor, had received £2,800 the late Archbishop of York, received £100,000,000.

Manufacturer's Bill.

The general manufacturing bill has become a law in this State. That is right. There should be no special charters, but general laws to regulate every department of Commerce, Finance, Manufacture and Agriculture.

An old lady down towards Seekonk, Long Island, once said her idea of a good man was —"A man what is keerful of his clothes, dont drink no spirits, kin read the bible without spellin' the words, and kin eat a cold dinner on wash day, to save the wimmin folks from cookin'."

It is said that the peculiarities of the canvas back ducks arise from their feeding on the wild celery; and if the experiment was tried of feeding tame ducks with that edible, they would be just as good. The tame ducks will not however, feed on celery.

The Medical Colleges of Buffalo and Geneva, in this State, have made arrangements to send Professor Coventry, of Geneva College, to Europe, to collect information regarding the best way to treat the Cholera.

It is expected that the first of the Cunard line of large steamers to ply between Liverpool and this port, will be out next month.—Captain Ryrie, who commanded the Hibernia last trip, has gone to Glasgow to take charge of the first, the America.

The Governor General of Canada received dispatches by the last mail, stating that a postage arrangement had been effected with the U. S., and would go into operation in April next.

The Egyptians believe the world to be resting on the horn of a bull, and when the bull tires of one horn, it pitches the world on the oiher, and thus causes an earthquake.

Profane language is to conversation what ten inch spikes would be to veneering—splitting, shivering and defacing it. It is in bad taste, offensive to a majority, and gratifying to none.

Hon. Washington Hunt, of Lockport, N. Y and George Bliss, Esq. of Springfield, Mass., were the purchasers of the Kalamazoo railroad, which was lately sold at Detroit under an order of the Chancellor.

In the reign of Queen Elizabeth, if bad fish was sold to the poor, the knavish fishmonger was decorated with a necklace of his unsavory commodity, and was then perched on a stand in the market.

The following sentiment was given at the New England Festival, held a New York:—The Daughters of the Pilgrims—no longer practicing witchcraft, but always irresistably bewitching.

The weather is said to be so cold in Franconia, N. H., that the natives lather their faces and run out of doors, when the wind cuts their beard off.

An Editor in Louisiana, received for a Christmas presents, a huge pound cake, a barrel of sugar, and a fine horse. A lucky fellow that.

A Bill making ten hours a day's work, has passed the Maryland house of Delegates by an almost unanimous vote.

Always answer the aged repectfully. No matter how tauntingly they may address you, treat them kindly.

The skull of the author of the immortal Declaration of Independence, is said to be in the Museum of the Patent Office.

The Hereford Times describes a drake with three legs, to one of which two feet were attached.

A cubic foot of water weighs sixty-two and a half pounds. There are 230 cubic inches in a gallon of water.

The personal effects of the Founder of the Smithsonian Institute are in the National Gallery.

Franklin's Printing Press is for sale at Washington.

Some Yankee in Mexico has opened a clothing shop, and dubbed it "Oak Hall!"

Over twenty cases of small pox has occurred at Bethany, N. Y.

A new style of bracelets, with watches inserted in them, are all the rage in Baltimore.

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For the Scientific American

Damask Weaving.

We commence a series of able, sound and elegant articles this week, from the pen of Mr. Gilroy. the author of the best treatise on weaving, ever published.

Damask, is a variegated textile fabric richly ornamented with figures of flowers, fruits, landscapes, animals, &c., and is a rich, elegant and expensive species of ornamental weaving. The name is said to be derived from Damascus where it was anciently made, with engines invented by that celebrated individual, E. K. Arphaxad.

The tweel of damask is usually half that of full satin (a full satin is woven with 16 leaves of headles, and, consequently, consists of eight leaves, moved either in regular succession, or at regular intervals.

The chief seat of the damask table-cloth manufacture, is at Lisburn, Lurgan, and Ardoyne, (near Belfast, Ireland,) where it is considered as the staple, having proved a very profitable branch of traffic, and given employment to many thousands of industrious people.

Damask table-cloths, &c., are manufactured extensively in the town and neighborhood of Dumferline, in Fifeshire, Scotland; but in point of texture, those made in Ireland greatly excel them, and particularly so, the goods produced by Michael Andrews, Esq., who is, without exception, the best manufacturer of this species of fabric in Europe. Damask table-cloths are also manufactured extensively in Belgium, at Silesia, (Austria,) and in different parts of Russia. In the last of these countries the texture is coarse, and is commonly known by the name of Russian diaper; the patterns, however, often display great taste; the cloth has but few picks of weft to the inch, but it is passed between two powerful iron cylinders, which flatten the threads, and give the texture a finer appearance than it would otherwise have; the goods nevertheless wear well, and are much used in the houses of the middle classes.

The table-cloth manufacture in Belgium is mostly confined to Courtray; the principal manufacturer there is, M. Alexandre In France the most extensive manufacturer of this kind of goods, is M. E. Feray, of Essonne Seine et Oise; this gentleman employs about 100 damask looms.

Table and piano-forte covers are manufactured pretty extensively in the north of England: but in regard to the finer kinds of linnen damask, there is no great prospect of their ever driving the Irish manufacture out of the market.

Silk damasks are manufactured in great quantities in Lyons, Paris, and several other parts of France, for ladies shawls, &c., they are also made pretty extensively in Spitalfields, and Manchester, (England,) and at Paisley, (Scotland.) Damasks have of late years been introduced wholly composed of cotton, in the form of shawls, and other ornamental kinds of dresses; and are mostly exported for the use of the negro population, both in Africa and America.

In table-cloth weaving the ground leaves of headles are generally placed seven or eight inches in front of the mounting which produces the figure; for if they were too near the mails of this mounting, they would, in working, strain and break the warp threads producing in the face of the cloth little loops, or something not unlike the ears of birds (house sparrows.)

Damasks, for table covers, are sometimes woven with a five leaf tweel, and often with one of eight or even more leaves. When woven with a five leaf tweel they are usually denominated bastard damasks, and when more than eight leaves are employed for the ground they are called superfine damasks. The eight leaf tweel, as before observed, is that which is usually termed the damask tweel.

The number of threads in each mail of these fabrics is likewise variable, being three, four, or more, according to the intended fineness of the web. Taking advantage of this circumstance, the damask weaver has seldom occasion to change his harness, though he may require to change the set of his reed; which is easily done by varying the number of threads in each interval in the same manner. This plan, for the sake of economy, is often carried still farther, particularly where great accuracy is not required, by drawing an extra thread in a mail occasionally at regular intervals, in the same way that weavers miss their overplus headles when the headles are finer than the reed. Damask, however, when wanted very fine, and when much accuracy and delicacy are required in the design and coloring of the pattern, may be woven in a full harness; but as these require a great quantity of cordage, and consequently are very expensive in mounting, especially when the pattern is large, the full damask harness is not common

(*To be continued.*)

Telegraph Punctuation.

The following signs of Electric Telegraph Punctuation, devised by A. J. Patridge, of the Hamilton Telegraph Station, C. W., have been used for about six months past on the Canadian lines, and are much liked. Mr. Patridge has sent them to the Scientific American, for publication, so that all Telegraphers may have the benefit of them if desired. This invention is much superior to using letters for that purpose.

.—.— Comma,
.—.— Semicolon,
.—.—. Dash,
.—.—. Colon,
..— —.. Period,
— — —. Exclamation.
—..—. Interrogation.
.—... Parenthesis, to be used before and after words to be parenthized.
—...— Italics, to be used before and after words italicised.
.—.— .— — Quotation, to be used before and after words quoted.
— — — — — Indicates a new paragraph.

For an apostrophe, the comma is used when necessary.

For a hyphen the dash is used when necessary; but the last two are seldom used.

Compressibility.

That quality by which a body allows its volume to be diminished, without diminishing its mass, is called compressibility. This effect is produced by bringing the particles which constitute said body closer together, increasing thereby the density and diminishing the pores. All known bodies are capable of having their dimensions reduced by pressure, or percussion, without diminishing their mass. This is a strong proof that all bodies are composed of atoms, the spaces between which may be diminished.

The substances with which we are surrounded are continually changing their magnitude. Water expands 1700 times its bulk by the application of heat and can be again reduced to its original bulk by condensation, and by cold it can become larger in bulk again the form of ice. Lead and iron can be compressed under the hammer, but fluids are difficult, yea almost impossible to compress by mechanical pressure and at most yield only to a very slight degree.

The question of the compressibility of fluids is an old one. About two centuries ago, at one of the Florence Academies an experiment was made with a hollow ball of gold to test the compressibility of water. The hollow ball of gold was filled with water and the aperture perfectly and firmly closed It was submitted to a great degree of pressure by which its figure was changed. Now a sphere has the peculiar property that if any portion of its figure is changed, its volume or contents are diminished, and hence the students in Florence reasoned that if the water did not come through the pores of gold or burst the globe, its compressibility would be established. The result of the experiment was, that the water did ooze through the pores of the gold and appeared like dew on its surface.—The Florentines therefore considered that water was incompressible, but in 1681 Mr. Canton communicated to the Royal Society some experiments, which at once proved the compressibility of water, by a more effectual experiment than by the golden globe He provided a glass tube with a bulb and filled the bulb and part of the tube with liquid well purified from air. He then placed this tube in an atmospheric condenser and submitted it to an intense pressure of condensed air, and he found that the level in the tube fell in a very perceptible degree, but whenever the pressure was removed the water rose to its former level, and thus not only proved the compressibility of water, but its elasticity also.

Interesting Cave.

Mr. Tuomey has lately published a report of his Geological survey of the State of Alabama. It is full of interesting and scientific information. He has visited numerous caves and one he visited in Blount county, in the Red mountain is a wonderful phenomena.

"In this cave," he says, "is the depository of lead and silver which had been worked by the Spaniards and Indians. Various implements, such as wooden trays to bring out the ore and large shells to convey food to the workmen within; European mats, copper dishes and even crosses, all doubtless used in metallurgic operations, had been found in this cave, besides a considerable quantity of lead. On the way I was delighted to find the archimedes of Leseur, a fossil peculiar to the carboniferous limestone, which told most distinctly that we were walking over the very rock in which the great Mammoth Cave of Kentucky occurs. After a few trials we succeeded in finding the entrance to our cave, which was quite inviting, being spacious and ornamented with stalactites which hung from the roof like richly carved pendents. The preparations for entering inspired my little guide with courage, and he volunteered his services to carry the lightwood; a little search enabled us to find the passage from the antechamber to the interior of the cave. We were obliged for some distance to assume a very humble posture, but occasionally, as the roof receded from the floor, we found resting places. At length a sudden depression in the floor brought us to a point where we began to find indications of the peculiar features of this cave; a little farther, and fragments of the human frame, and bones of many a stout limb were scattered about in every direction; the trays were there too, but emptied of their contents for they were the coffins that once enclosed these remains. Some of them were hollow logs split in two, others were excavated for the purpose, and bore evident marks of a narrow axe, probably a tomahawk. They were generally the length of a man. Pieces of the matting also remained, which were composed of the splits of the common cane, but very neatly made, and were doubtless the shrouds in which the bodies were enveloped. The number of coffins that remain is very great, considering the many that must have been destroyed or carried away. I found among the bones the skull of a large rodent, doubtless a beaver. I saw no excavations except those of a recent date—the work of the white man. It was common with the aborigines to bury with the dead, trinkets, &c., but it does not appear that they ever accumulated the precious metals, much less buried them with the dead, at least I have never known any one to make a fortune by digging into mounds or Indian graves. I imagine that far other cares occupied the minds of those who laid the brave and the true hearted of their tribes in this solemn and appropriate resting place.

A Human Divining Rod.

Among the smaller lions of Paris at present is an individual possessing great interest—the Cure Paramelle, the humble village priest—who has been sent for by the Academie des Sciences to enlighten that respectable *corps* of *savans* concerning the extraordinary gift which he possesses of discovering hidden springs beneath the earth. The Paris papers say that he has a touching simplicity of his manners, and utter unconsciousness of the impotence of the gift with which it has pleased heaven to bless him. It appears that his powers are most extraordinary, that *he has never once been deceived*, but told on the instant, without hesitation, the exact spot where water may be found. He is singular among those who have hitherto possessed the art, in his utter independence of the divining rod, which he has never needed. He describes the sensation he experiences when walking over a spring, to be that of a keen and pricking pain in the throat and nostrils, like that occasioned by the inhaling of phosphorus or too strong a pinch of snuff.

Scientific Memoranda.

The mechanical advantage gained by the inclined plane is as much as the length of the plane exceeds in height.

The advantage gained by the mechanical power of the screw is in proportion as the circumference of the circle made by the lever or the wrench in turning it, is greater than the distance between the threads of the screw.

In considering the advantages gained to machines, it may be observed generally, that whatever power is gained by an increase of motion. The amount of power gained may indeed be immense, but it is gained entirely by a proportional increase of velocity, as the moving power or a proportional sacrifice of time in performing the operation.

We know the existence of iron in two states so dissimilar, that in the one it is to the electric chain like platinum, and in the other it is like zinc: so that powerful galvanic machines have been constructed of this metal.

Ten, twenty, or more pounds weight of mercury brought into contact with a mixture of ether and carbonic acid, become in a few minutes firm an malleable.

If a piece of potassium be placed on ice, it instantly takes fire with a bright flame, and melts a deep hole into the ice.

When the clarified juice of nutritious vegetables, such as cauliflower, asparagus, or turnips is made to boil, a coagulum is formed which it is absolutely impossible to distinguish from the substance which separates as a coagulum when the serum of blood or the white of an egg, diluted with water, are heated to the boiling point.

Dr. Priestly, had a burning glass constructed nearly three feet in diameter and it produced a heat that melted iron plates in a moment. It melted 20 grains of gold in four seconds, 20 grains of silver in three seconds, 10 grains of platina in three seconds, and as much flint in 30 seconds.

An iron pillar square at the top and bottom, is about three times as strong as if rounded at the ends; if the pillars are not placed perfectly perpendicular, at least two thirds of their strength is lost; and they are one seventh stronger when swelled in the middle, like the frustrum of a cone, with the base in the centre of the pillar.

A silver wire, the thirteenth of an inch in diameter, will sustain one hundred and thirty-seven pounds. A wire of lead, of the same size, sustains twenty-eight pounds, and tin, 36 pounds.

The English Board of Admiralty is stated to have in their possession a chronometer watch which has not varied a second in 17 months.

Hydraulic Telegraph.

A patent has just been taken out in England, which the patentee, Mr. Jowett, claims to be a most important advancement in Telegraphic science. More effective results are said to be obtained by his new Hydraulic Telegraph—the first of which is economy in the construction of the hydraulic telegraph, which will be at least a saving of two-thirds, compared with the outlay required by the Electric, independently of the considerable increase of speed. Secondly, no expense whatever (after the first amount of construction) will be necessary to provide for the continuous working of the hydraulic telegraph, it being beyond the possibility of doubt that any atmospheric changes can interfere with or affect the success of its operations. Thirdly, no physical impediment can compete with the perpetual use of the hydraulic telegraph—neither height, depth, sinuosity, nor distance stopping in the slightest degree its perfect action.

These are the claims which the patentee has advanced, who has been exhibiting models and plans at No. 17 Wellington Strand, London. Its particular nature and construction we do not understand full enough to describe it, but may be able to do so in some future number. At present we have doubts respecting its superior advantages.

An exchange paper says that cucumbers can be made into pickles while growing, if you get a cross old maid to look over the fence at the vines three times a week.

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New Inventions.

Improvement in Fiddles.

Mr. John Holmes, of Holmes' Hole, Martha's Vineyard, has made some valuable improvements in the mode of constructing fiddles, whereby the volume of sound is concentrated and made far more powerful than by the present manner in which they are made. The invention does not relate to additional strings—the outside is unaltered—but by the combination of steel wires brought to an extraordinary degree of tension and fitted in the interior of the instrument, a poor and indifferent violin can be suddenly made equal to the finest, at least in the depth and fullness of tone. We believe that measures have been taken to secure a patent.

Improved Safety Lock.

Mr. William Hall, of Dock Square, Boston, has invented a new Lock, which is said to possess some advantages, such as the small dimensions of the key, and an ingenious mode of closing and protecting the key-hole, which are worthy of attention. There is an arrangement which secures the lock from being blown up with powder, there being no opening to the interior of the lock—and also secures it as effectually against picking, there being no chance for pressure on the bolts while the pistons are uncovered, nor opportunity to work on the pistons when the pressure is on the bolt, except with a true and perfectly fitted key.

Improvement in Flax Spinning.

Mr. Robert Patterson, a practical and experienced Flax spinner, of New Hartford, Oneida Co., N. Y., has made some very important improvements in the method of manufacturing flax, which must be of great benefit to this rising and valuable branch of American industry. Mr. Patterson by his own process entirely disposes of all the hetchelling and spins his thread without that operation, and we have been informed, makes a far superior article. No linen cloth is made in our country, but there are great quantities of flax thread, not enough, however, to meet the market demand. This invention then, for which measures have been taken to secure a patent, merits the profound attention of flax manufacturers.

New Invention.

Mr. Z. M. Crane, of Dalton, Mass., has invented a new plan for regulating the ballasting of our steamboats. It is well known that huge boxes of great weight are fitted upon wheels and rolled from side to side of our steamboats as the case may require. The dragging of these boxes is all done by hand, manual labor, and a very clumsy method for the purpose it is. Mr. Crane can shift the necessary weights and regulate them by his plan far more easily and more mechanically than by the present method. He uses a shaft and cog wheels to be turned by a crank by one man, or connected with the engine.

Cast Iron Chimney Tops.

The various uses to which iron is being applied, are increasing daily. Within a short time it has been used for ornamental chimneys. They are considered to be far more durable than brick, they are at least far more beautiful in design.

Novel Musical Instrument.

Mr. George Lovatt, of South Street, Philadelphia, has invented a new and curious musical instrument, which consists of a plain frame about the length of the ordinary piano, upon which are suspended solid blocks of stone, thirty-eight in number, cut in the form of a sash-weight. These blocks are beaten upon by wooden mallets, partially covered with buckskin, and the music produced is astonishingly sweet.

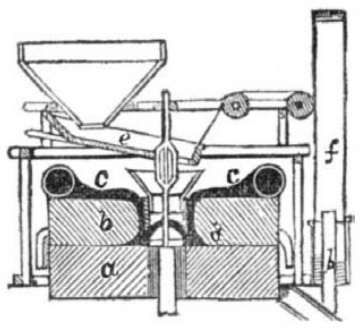
New Railroad Wheel.

Mr. Alfred Judson, of Rochester, N. Y., has invented a Railroad Car Wheel, which promises to be of great utility. It has heretofore been found necessary, in casting car-wheels, to divide the hub longitudinally, into three parts, in order to provide for the contraction of the metal in cooling, and in completing the wheel, to fill the opening in the hub with zinc, and securing each end with heavy wrought iron bands. The plan adopted by Mr. Judson consists in separating each spoke or arm near the rim, by making a part of it form a hollow cylinder, of four inches in diameter, the length or which is equal to the width of the arm, and of equal strength the arm being separated at the point where the cylinder unites with it. The consequent elasticity of the cylindrical portions allows the wheel to contract without fracturing in cooling, while the simple insertion of a bolt, where the separation is made, gives to the wheel full strength and solidity. The Auburn and Rochester Railroad are about introducing this improvement, and favorable opinions are entertained in regard to it.

We expect to be able to present a cut and more full description of Mr. Judson's valuable invention in a future number. Measures have been taken to secure a patent.

Improvement in Grinding Grain.

This a late invention of Jacques F. Pinel, of Lyons, France, for a peculiar manner of causing currents of air to pass between the surfaces of stones. Currents of air are conducted downwards by tubes with enlarged upper ends and introduced beyond the eye in the centre of the running stone in a direction to cause the air to flow towards the circumference of the stones, propelling the ground product in an outward direction and keeping the grinding surfaces cool, a very important consideration, as the wheat is often spoiled to make good flour by the stones being too much heated.

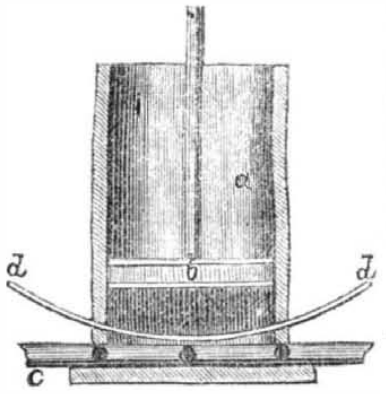


This engraving is a sectional view of the arrangement, the peculiar feature of which consists in the four tubes employed being curved inwards at their lower ends, seen at *d*, for the purpose of blowing between the surface of the stones, *a b ;* the mode of supplying the machine is, as heretofore, through the centre or eye, by means of the shute and hopper-shaped case, *e ; a*, is the underneath stone, of ordinary construction ; *b*, the running stone, having on its upper surface six, or any other suitable number of horn-shaped tubes, placed around the top surface of the stone ; these outer ends extending as far out as possible, so as to describe the greatest circle, for the purpose of more effectually collecting the air as they revolve, and conducting it down between the running and under surfaces of the stones; *c c*, are the air tubes, the novelty of which relates to the curved form given to the ends which pass down through the running-stone, and turn outward at *d*, preventing by such means the currents of air thus collected escaping back through the eye, or centre.—The spout, *e*, can be raised or lowered at pleasure by means of a rope passing over the pulley wheels, seen in the engraving The action of the machine thus given receiving a motion from any suitable means hitherto employed for such purposes. The second part of this invention consists in collecting the moisture from the ground products, and allowing the pressure of air to escape; for this object the patentee employs a small vertical air flue, *f*, mounted upon the top of a shute, used for discharging the ground wheat from the surface of the stones ; the shaft, *f*, receives a tube *h*, through it, which communicates with the shute, for the purpose of catching the moisture as it is generated during the grinding process, by the accumulating depositions evolved ; the top of the flue, instead of being open to the free passage of the air, has within it, at the top, a ventillator of the usual construction, which prevents the immediate escape of the moisture, creating a slight rarefaction therein, and detaining the depositions.

An apparatus having tubes with enlarged ends has been used for the same purpose before, but the curved form given to the ends for blowing towards the circumference and the air flue for collecting the moisture are the improvements claimed by Mr. Pinel.

Gun Cotton Engine.

This is a late invention of W. Fox Talbot, of the county of Willts, England, for producing motive power by the employment of solid substances such as gun cotton which is the peculiar feature of the invention. This gentleman is also a patentee for an invention of deriving motive power from explosive gases, but he considers the gun cotton more safe and better.



This engraving is a representation of a sectional elevation of an ordinary piston and cylinder connecting with the working part by crank or other arrangements.

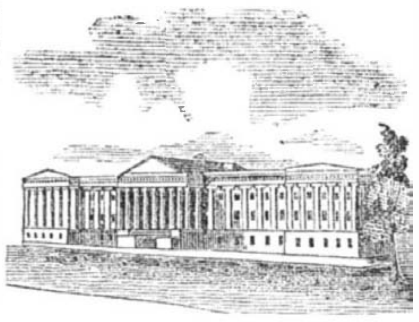
At the bottom of the cylinder, on each side, are circular holes, in which the explosive material is supplied to the cylinder by the application of the tubular slide containing the gun-cotton ; passing through the cylinder, is a platina rod or wire, for the purpose of being excited by a galvanic battery, and exploding the gun-cotton ; *a*, is the working cylinder ; *b*, the piston and connecting rod ; *c*, the tubular slide containing the explosive material ; *d d*, the platina wire. In preparing the cylinder for working order, it will be first necessary to fill the tubular slide with gun cotton, or each division thereof formed within it, so as to allow a portion of it to be exposed to the immediate action of heat when passing through the cylinder, by being brought in contact with the platina wire, excited to a white heat by the battery aforesaid, care being taken that one division shall have discharged its contents before another is introduced, thus causing by repeated explosions a motive power for giving motion to machinery of various kinds, such power being regulated entirely by the quantity of explosive material employed, and the speed given to the slides when passing through the cylinder. The patentee proposes to attattach one slide to another, so that when one has discharged its explosive material, another will have entered and taken the place of the other which has been drawn through in readiness to be refilled

The patentee claims the employment of a solid substance to produce motive power to work machinery by means of heat by having portions of the gun cotton enclosed in tubular slides exploded by a galvanic battery, communicating internally.

This invention, is, we think, more novel than useful Economy is the grand desideratum of all inventions, and gun cotton, ether, powder, galvanism, and all such chemical powers are far more expensive than coal and water.

A Roman Engineer, named Sartori, has obtained a patent from His Holiness the Pope, for a new project for railways calculated to surmount the greatest inequalities of surface, without tunnels or viaducts.

A machine worked by the steam of ether, has been in full operation for some time past, in a glass-cutting manufactory, at Lyons, France. Its power is equal to that of twenty horses.



LIST OF PATENTS

ISSUED FROM THE UNITED STATES PATENT OFFICE,

For the week ending Feb. 15, 1848.

To James P. Gage, of New York City, for improvement in machinery for Sanding Paper. Patented Feb. 15, 1848.

To Henderson Warner, of Hamilton Co., Ohio, for improvement in machinery for making Brooms. Patented Feb. 15, 1848.

To Ralph D. Curtiss, of Erie, Pa., for improvement in stores, counting rooms, &c. for preserving property in case of fire. Patented Feb. 15, 1848.

To Abraham Randal, of Genoa, N. Y., for improvement in Potatoe Planters. Patented Feb. 15, 1848.

To Levi Gilbert, of New Haven, Conn , for improvement in plates for Artificial Teeth.—Patented Feb. 15, 1848.

To George E Roberts, of Buckley Springs, Va., for improvement in Washing Machines. Patented Feb. 15, 1848.

To Edwin Smith, of Whitestown, N. Y., for improvement in Cooking Stoves. Patented Feb. 15, 1848.

DESIGN.

To Joseph G. Lamb and Charles Zoiner, of Cincinnati, Ohio, for Design for coal and air-tight Stove. Patented Feb. 15, 1848.

INVENTOR'S CLAIMS.

Burring Machines.

By Ziba Parkhust, of New York City, Improvement in Burring Machines. Patented 11th September, 1747, and dated 11th March, 1847. Claim, what I claim as my invention, and desire to secure by letters Patent is, 1st. The combination of the receiver, stripper, middle clearer, middle stripper, top stripper, hoppers, and shell, whether arranged in the manner above described, or in any other mode or manner, which is substantially the same by which results analogous to those above described are produced. 2d. I claim the zig zag, or angular strippers, as above described, and represented, for the purpose set forth, and generally, whether used in combination with a cylinder, constructed like the cylindric, or a cylinder constructed in any other form. 3d. I claim the combination of the shell, with the receiving cylinder for pressing the wool against the cylinder and protecting it from the dirt thrown off by the strippers, whether made in the manner described or in any other mode or manner, which is substantially the same.

Artificial Teeth.

By Morris Levett and Henry Davis of New York City, (the said Levett having assigned his right, title and interest to said Davis.) Improvement for coloring the Plates for Artificial Teeth." Patented 18th September, 1847. Claim.—What we claim as our invention and desire to secure by Letters Patent is the japanning or otherwise covering the setting or foundations of artificial teeth in such a manner as to disguise the setting so as to represent the gum, or natural skin of the mouth as nearly as possible, whether the same be effected in the manner described or by equivalents substantially the same. We also claim the herein described japan or varnish, and the method of compounding and applying the same to the settings of artificial teeth.

Blind Fasteners.

John L Basset of Bridgeport, Conn. Improvement in Window Blind Fasteners. Patented September 25, 1847. Claim—What I claim as my improvement and desire to secure by letters patent is, connecting the latch to the plate by the notch and the projecting branch, in combination with the prong and spring.

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NEW YORK, FEBRUARY 26, 1848.

Science and its Language.

There are many who have singular ideas regarding Science. They consider it something which belongs and is known only in Collegiate Halls. Something that cannot be explained in common language but requires a peculiar jargon of its own, to mystify, not explain itself. This has arisen from the custom of Professors mystifying plain truth by soldering names of "wondrous length and thundering sound" upon common plain facts, to give them a *learned* appearance. The physician must prescribe in an unknown tongue, and the naturalist and geologist must stitch up the whole science with such names as *megalosauri* and *iguanodons* and some others longer and more uncouth still. These names we think, instead of being science, or displaying a simple and clear classification, only exhibits the weakness —the pedantry of the scientific.

Science is a clear arrangement of facts derived from a close and correct observation of nature, and certainly the more simple the language that is used to explain or describe those observations, the more confidence do we place in the author—he satisfies us that his observations are not dreams

We have thrown out these few hints, hoping that they may be not inappropriate at this time. We know ourselves how difficult it is to overcome old predilections, especially those that have been instilled into our minds by education, but we consider that mystic language is the most unscientific part of science, and that it is injurious to a clear comprehension of it by those who are unacquainted with any other language than their native tongue.

Patents and Patent Laws.

From a number of communications which we have lately received requesting information upon this subject, we consider it to be our duty to give plain and candid advice to inventors as to what can, and what cannot be of any benefit to them under the seal of a patent.

There are many different opinions respecting the nature of patents and the property, as it is called, of inventors. Some consider that a new invention is a new creation, and that the inventor ought to be protected by law from any person infringing upon his discovery, using it in any manner without his consent, in the same manner that landlords are protected in the right of private property. This they consider ought to be in perpetuity, patents to be recognised as heritable property. No government, however, has any Patent laws based upon this theory. All governments have made patent laws, for the encouragement of genius, for the protection of a discoverer in receiving a personal benefit in any thing new and useful, but with the ultimate object in view of national benefit. Hence we perceive that patents are granted by all governments only for a certain number of years, and then the public become joint proprietors in the invention. The term for which a patent is granted by our government is fourteen years, but may be extended seven years longer if it can be proved that the inventor has taken reasonable measures to get his invention introduced, and has not been sufficiently remunerated. Some patents have been extended to twenty-eight years duration by special act of Congress, such as Blanchard's for turning duplicate patterns on a lathe, and Woodworth's planeing machine and Wood's cast iron plough.

It is well known that many inventors who have produced valuable machines which have benefitted the whole world, have never received much pecuniary benefit themselves — Fitch, Evans, Annesley, and a host of others might be mentioned. Other inventors again have been well paid for their discoveries.—Arkwright died worth hundreds of thousands. Watt was rich, and Blanchard we believe, and many other inventors in our own country, have become rich. The generous voice of the public is, "let our inventors be well rewarded—they are our nation's gold and silver."—Amen, is our response. But while the public rejoices to see inventors well remunerated for their discoveries and desires to see them protected to the fullest extent in their rights, the public on the other hand, as justly detests and repudiates protecting, rather affording privilege by law to those who have purchased patent rights and who do so to monopolise wealth for themselves through the inventions of others. There is much prejudice we believe against purchasers of State and County patent rights, but were it not for the sale and purchase of these rights, the inventor perhaps from personal circumstances, could not have been the least benefitted, from inability to manufacture his own invention. We must say, however, that great caution and honor in dealing should be exercised by patent right owners Patents are not granted for the purpose of making rich by exclusive privileges, any other person than the inventor. The abuse of purchased patent rights by a few, has raised much prejudice and ill feeling against the many, and it is no wonder if juries make decisions often adverse to patent rights.

Every inventor should be aware of one thing, viz. that a patent is not always a certainty of success in a law suit. A patent cannot always be sustained If it can be proven that the claimed invention covered with a patent seal is old and well known, it is of no value whatever. Many patents no doubt are granted for things that are not new inventions. We often wonder there are not more of this kind. It is not possible that any Examiner can be acquainted with all the combinations of machinery or compositions of art, throughout the whole world, or of all those that have been used since the day that our Father Noah built his Ark; they judge so far as they are able to judge of usefulness and novelty, and they may often be mistaken. Inventors themselves must and should have a clear conception of what their inventions are, what old difficulties they have overcome and new and useful results they have arrived at. Unless inventors themselves have a clear conception of what they wish to patent, they need not be surprised if they should be disappointed.—Before applying for a patent an inventor should make every inquiry about his invention, whether such thing has been known before or not. We always, so far as we are able, give candid advice regarding such things.

It is no evidence that an examination in the Patent Office can fully be a guarantee of a patent being granted for something not to be found there. The Patent Office is supplied with foreign periodicals of a scientific nature, and inventions described in them precludes the granting of a patent right for the same things here.

Caveats should be clearly made out and the discovery plainly described, so far as to define its novelty. Specifications should be plain, brief and simple, distincly claiming what is new.

Although many useful inventions have been unfortunately of no personal benefit to the inventors, yet there is great reason to hope and believe, that as a general thing patent rights for new and useful inventions are the means of advancing both in wealth and worldly elevation the majority of inventors. We have always advocated their claims and we believe that public opinion is upon our side in a desire to see inventors reap the rewards justly due to their merits.

Steam and the Steam Engine.

C. M. Copeland, Esq. U. S. Engineer, has delivered three lectures on the Steam Engine before the Mechanics Institute of this city.—Mr. Copeland is not a practical lecturer, but we have listened with pleasure to his remarks. All are the result of his experience. The first lecture had relation principally to the nature of steam, a consideration of the difference between it and other gases, from which it differed materially. If one cubic inch of water is put into a vessel, sufficiently large, and heat applied, it will form 1700 cubic inches of steam at a temperature of 212°, or at the level of the sea, where the pressure of the atmosphere is about equal to 15lbs. per square inch; but if the steam should be generated at an elevation of two miles, the boiling point of water would only be 194°, owing to the diminished pressure of the atmosphere at that height. This is illustrated by boiling water in a Florence flask, and when the air in the flask is excluded, stopping the bottle up, and on condensing the steam in the flask, by the application of snow, the pressure is removed from the surface of the water in the flask, and an immediate ebullition takes place, though the temperature of the water is not more than 98° This experiment was performed at the second lecture.

Sea water boils at 214, and saturated salt water at 226°.

Latent heat is a principle in the heating of water by steam discovered by Prof. Black, of Glasgow, and in which consists the economy of using steam for heating baths, in preference to direct fire *heat*, inasmuch as one cubic inch of water heated to 212 will raise 5½ cubic inches of water from 32 to 212°.

Mr. Copeland explained the different kinds of boilers now in use both for locomotives and steamboats. He stated that it was generally considered in the West, that the life of a steamboat was only four years, and they therefore did not provide either such good boilers as our Eastern boats, and used the high pressure non-condensing engines One steamboat that he knew, never made a trip from Pittsburg to Cincinnati under a less pressure than 200 pounds. He believed that as the common cylinder boilers were used on the Western boats, the frequent cause of explosions was a sudden generation of steam, so sudden that no safety valve could stand it. This was caused by the water getting too low and part of the boilers being red hot. The reason why the ends of the boilers were always first blown, was from the mode of their construction.

The Eliopole of Hero, he said, was a rotary engine, and he thought that the construction of a good rotary was very remote.

As applied to navigation the non-condensing engine was superior to the condensing for navigating shoal waters, as there was much less weight of machinery and water needed, and for locomotives it would be impossible to use them if they were condensing engines. The superiority of the condensing over the non-condensing was in the power gained by the vacuum formed by the condensation of the steam, but a non-condensing was just as safe as a condensing, and for small engines they are the most convenient, being more simple and cheaper.

New kind of Hemp.

A plant called Bear Grass, which grows abundantly in Alabama, and is prepared by boiling the blades and afterwards washing the fibre free from pulp, presents some features as an article of manufacture which may yet make it very important as an article of Southern culture, commerce and manufacture. It grows on the sandy lands of the South, is indigenous and grows luxuriant. An acre will contain 1742 plants at 5 feet each way, and each plant will produce one pound per annum, and if worth as much as hemp, will give to the grower one hundred and four dollars per acre. A sample has recently been received at the Patent Office, along with a description of the plant itself, also the mode of preparing it. It is said to be finer in the fibre than the finest hemp of Yucatan.

Influence of Railroads upon the weather.

We have seen some paragraphs going the rounds attributing the present mild winter to our railroads, considering them to be so many electrical conductors partially equalising the electrical states of the earth and air, over and through as broad a space as they pass, producing changes and those changes a superior mildness of climate in many parts of our country. We cannot see what influence the railroads can have to affect the weather, nevertheless the subject is worthy of attention. Cultivation we know, has been the means of rendering the climate of many countries more temperate. But as it regards the effects of railroads upon temperature, a few years experience will settle the question, and if it be found that railroads do affect the weather, then assuredly we should like particularly to possess some stock in them.

Mission of Mechanics' Institutes.

When we look on a Mechanics' Institution, however humble, we ought to see something more than the mere obvious consequences of such institutions. Properly conducted, they will gradually but surely illuminate with the rays of knowledge, the dreary waste of man around us; and being extended every where, will be like so many beacons, each with its little circle of light and intelligence around it, and daily widening until the delighted imagination leaps at last to the time when the whole of our country at least will be flooded with the abundance of knowledge and happiness, which by the timely wisdom of man, aided by the Great Being, who may, without disrespect, be said to smile with pleasure on such efforts, shall have effected. The thought of happiness which the diffusion of knowledge is fitted to produce, and the dangers which it will hold so powerfully back from us, is one of the most interesting and sublime ideas which the heart of man can entertain, and in our eyes gives a portion of its own dignity to the most small and apparently insignificant Mechanics' Institute, as being closely connected with the great work of improving so many millions of our countrymen. Therefore let no vile slander from the withered lips of faction dare to pollute their most holy and virtuous path. Let not bloated bigotry stretch forth its weak but malignant hand to shadow their brightness. Let no disputes or jealousies of their own members bring unmerited disgrace on their righteous and useful cause; and, finally, let no pains be spared to bring within the pale, those who are groping in ignorance without. In the work of making Mechanics' Institutes useful, no exertion is too great: and to it may be applied truly that remark which a noble lord once rather misapplied in the house of peers at the French revolution—"that we ought to carry on the war in the same spirit as we are taught to worship our Creator—that is, with all our hearts, and with all our souls, and with all our might, and with all strength." Truly in such a spirit ought we to war against ignorance.—*Leigh Hunt.*

We cannot too strongly recommend the above to the attention of our young mechanics. Every mechanic should be a member of some Mechanics' Institute.

Alabama Coal.

A bed of coal has been discovered at Tuscaloosa, Ala., and the more it is used, the more highly it is esteemed. For blacksmiths use and the manufacture of gas, it is considered superior to all others, and for fuel it is preferred by many on account of the freedom with which it ignites and burns. Exact analyses shows that, with one exception, the Tuscaloosa coal contains more carbon than any other American bituminous coal.

The company of Sappers and Miners, now in Mexico, consists of less than 30 men fit for duty, out of 71 that left West Point, a year from last September.

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Reaction Water Wheels.

(Concluded from our last.)

Had the Committee said, a wheel propelled by the pressure of the water in a direction of the circular motion of the wheel, caused (not developed) by the discharge of the water in a contrary direction, is a reaction wheel, I would have accepted the definition. Perhaps they meant no more.

If their answer to the second interrogatory is intended to cover no more ground than the question, I would say with them, "they are reaction wheels so far (and no farther) as they owe their propulsive force to this action."

But the fourth answer seems to cover more ground. Thus, "if the propulsion of the wheel be in whole, or in part, from the pressure of the water developed by its discharge in a contrary direction to the circular motion of the wheel, no change in the form of the channels, or tubes, conducting the water to the orifices will take the wheel out of the definition." I understand them to mean this: if the wheel is propelled partly by reaction, and partly by something else, no change in the shape of the guides to the issues will entitle it any other name. Now I apprehend, the very circumstance of changing the form of the surfaces conducting the water to the wheel, might so adapt the wheel to receive the impulse or pressure of the water, "in the direction of the motion of the wheel," being properly directed there, that so much of its power would be derived from this source and so little from reaction, that it would take the wheel entirely out of the definition.

I would ask, if a body, B, under motion, should impinge or press against the body C, in a direct line or obliquely, and thus communicate its momentum to C, would C owe its motion to action or reaction?

The third interrogatory seems to embrace another principle, though the answer is founded upon the hypothesis, that if a wheel discharges the water in a contrary direction to its motion, it *must* be a reaction wheel. "If a wheel discharge the water propelling it, issues inwardly, and in a contrary direction to the motion of the wheel, is it a reaction wheel?" and is answered in the affirmative.—Now I am not clear, that a wheel discharging the water towards the centre, could be made to run with any degree of power or motion, (if at all) by reaction alone; for the centrifugal force of the water in the wheel would so press to the verge, and in proportion to its velocity, it would require a powerful pressure of the water behind to force it out, thus communicating motion to the wheel by its pressure upon the angles or buckets. I know of such wheels in use yielding double the amount of power to any reaction wheel in existence. If the above answer to the third question be correct, all scroll or central discharge wheels would be included in the category, as they discharge the water inwardly in a contrary direction to their motion, yet no one out of the hundreds I have seen and built, was ever supposed to be anything but a wheel of impulse and pressure.

I have hastily thrown together these remarks, as my profession calls me to *work* out principles, rather than *write* them out. I should not have noticed these questions and answers, only believing that there is a prevailing error existing very extensively in relation to wheels of this class, and also that these answers were obtained to subserve certain purposes, and not to enlighten the public on a subject upon which they needed light. The very high character of the gentleman composing that committee, both as to scientific attainments and respectability, forbids my doubting their integrity, and leads me to be slow in adopting opinions differing from theirs; but having been a practical mill-wright for twenty five years, and having put in operation almost every kind of wheel in use believing in calling things by their right names, I have thus given my reasons why I believe nine-tenths of the reaction wheels (so called) are not entitled to that appellation.

ELIJAH BISHOP.

Jamestown, N. Y. Feb. 1st, 1848.

"It strikes me"—began an orator. "Then why don't you strike it back?" inquired a sailor in the audience.

Sleeping.

Children should never be laid to sleep in hard beds. The bird feathers its nest with down to soften the beds of its tender offspring and those who think that by miserable beds the children of the poor are made more strong and hardy than those of the rich, have but to consult sanatory statistics and they will at once be undeceived regarding the mortality and health of the young who sleep soft and are warmly clothed and nourishingly fed.

Those who are troubled with palpitation of the heart should sleep with their heads high and never have the head within the bed clothes. It is customary for many people to cover their heads and slumber in this manner. This is injurious to the lungs as the air that is exhaled is at the next breath inhaled. Some children get into this bad habit, and parents should be careful to watch them and break it up. To wash the face, hands and teeth before going to bed contributes much to sound and refreshing slumber, and refreshing sleep is as necessary to the health of body and mind as our daily food. Night is the best period of repose as it is the most natural.—Those whose occupations lead them to be much awake at night, often fall into consumptive diseases. Eight hours is not too long a period for sleep, although many never sleep more than six.

Bedrooms should not be low in the roof, should be well ventillated and frequently submitted to currents of air passing through them but never when persons are asleep. A damp atmosphere to sleep in should be avoided, and in every case after rising, the face, neck, hands and teeth should be well cleansed. For all that has been said regarding full meals before going to bed, if one hour is allowed before lying down to repose after eating a hearty meal, it will perhaps do more good to nourish the system than if taken at any other period of the day. ONE WHO KNOWS.

Formation of Hail.

Hail is supposed to be formed in the upper regions by a sudden and extensive vacuum being formed along with a watery cloud whereby a quantity of caloric is extracted from the water, and the drops fall upon the earth in pieces of ice.

The Chemnitz mine in Hungary affords an experimental exhibition of the formation of hail on a magnificent scale. In that mine the drainage of water is raised by an engine, in which common air is violently compressed in a large cast-iron vessel. While the air is in a state of high compression, a workman desires a visitor to hold his hat before a cock which he turns: the compressed air, as it rushes out over the surface of the air within brings out some within it, which is frozen into ice balls by the cold generated by the air as it expands; and these shoot through the hat to the no small annoyance of one party, but to the infinite amusement of the other.

Formation of Coal.

The Richmond Va. Enquirer notices the interesting circumstance of the conversion of wood into coal, it may be said under the eye of an observer. In the excavations some time since, on Council Chamber Hill, a large piece of wood in a state of decay, was dug up. It was very soft, yet the bark and textures and the perforations of worms were entirely distinct. It was presented to the Medical College, and while lying upon the table in the cabinet of the institute, it has been converted by a natural process into coal. It gradually becomes hard, unyielding, and brittle, having a "fracture" and lustre like that of coal, It cannot be easily distinguished from the ordinary coal of our mines, and burns with a brilliant flame like the famous cannel coal.

Better Stand Up.

The Mountain Eagle says that a youth came stalking into our office on Tuesday morning last, after the manner of many others, who call without any particular business, and quietly seated himself on the stove. The balance of the scene was indescribable. The stove was hot enough to singe a feather, and this "child of nature" had never seen one before.

In Oregon, laborers get three dollars a day, and carry a hod made of Rosewood.

The People of Central America.

In the towns not one in ten can read or write and in many parts of the country, not one in a thousand. In many villages containing some thousand inhabitants, no person is to be found who can read. and when a traveller is compelled to show his passport to the alcade, who is the first civil and criminal judge, he is generally requested to read it. Morality is at the lowest ebb among all classes, especially the whites and creoles; indeed, I could never find that among them any disgrace was attributed to any sort of crime except petty larceny. Murder, perjury, forgery and swindling of all sorts are considered quite veniel. The priests are, for the most part, blind leaders of the blind; and the better educated consider themselves as actors, whose business it is to extort money by acting the part which will please the people. Forms and religious parade are carefully kept up, but no one thinks of inculcating private morality, or even decency. The marriage ceremony is also, as might be expected, considered merely as a form to keep up public decency, and both man and wife act in private as they please, I never saw any native of Central America that would admit that there could be any vice in lying: and when, one has succeeded in cheating another, however gross and infamous the fraud may be, the natives will only remark, what a clever fellow? All classes are addicted to gambling, and far more money changes hands in this manner than in commerce or any legitimate business. Nearly all the Guatemala merchants, who are the only ones possessed of any capital, have commenced their career with rascality. One of the richest of them was some years ago, when in bad circumstances, sent to look after a quantity of very valuable goods which had been abandoned by the carriers in some revolutionary panic; but, instead of restoring the goods to their owner, he altered the marks, and so mixed them together that when they came to Guatemala they could not be identified; there he managed to keep the greater part by selling which he at once accumulated a good capital for commencing business: and being a shrewd dealer, and above all, a successful gambler, he has realized what is in Central America a large fortune, and he is courted by all the Belize merchants. Concubinage is common among all possessed of any wealth; nor is this, as in other countries, done secretly, if at all; but even wives will publicly speak of their husbands' mistresses.—*Dunlop's Travels.*

A Phenomenon.

A beautiful celestial phenomenon is described by the St. Louis Union, having occurred in that city on the night of the 30th ult., about eight o'clock in the north-eastern part of the firmament. Columns of a pale yellow light were shooting up from the horizon far away into the heavens. and after remaining stationary in a vertical position for a few moments, would move slowly towards the west, gradually changing their forms and colors, to that of an irregular deep red cloud, alternating occasionally in color from red to white, then back again to red, and gradually disappearing.

Cotton.

Paper was first made from cotton rags in the year 1000.

The most ancient MS., on cotton paper, with date, is in the library of the King of France, and was written in ten hundred and fifty. Paper was first made from linen rags in 1300. The art of weaving was introduced into England in 1330. The spinning-wheel was invented by Samuel Crompton in 1775, for spinning yarn. The spinning-frame, the principle of which is now in use, was invented by Richard Arkwright, in 1761.—Power-looms were invented by Dr. Cartwright in 1783.

Cotton was first planted in the United States, in 1769. Cotton yarn was first spun in America about 1787, at Beverly, Massachusetts.

An End to a Circle.

A hard-up male acquaintance was overheard soliloquizing thus:—"they say a sovereign is round, and so it is; but give a woman one to take to a draper's shop, and she'll soon make an end to it."

Eminent Men.

George Washington, Andrew Jackson, and William Henry Harrison were farmers. From the pursuit of agriculture they went forth to pursue the enemies of their couniry, and from the fields of death gathered the "Golden immortal."

Sir Richard Arkwright, who first conceived the idea of spinning cotton by means of machinery, passed the earlier part of his life in pursuing the humble occupation of barber. His genius proved to be brighter than his razors,

John Leslie, Professor of Natural Philosophy in Edinburgh, was the son of a poor farmer in Largs, Scotland. He was employed in the capacity of herdsmen. His pencil was a stick and the earth his slate. From being the companion of cattle, he became the peer of learned men.

James Ferguson was in earlier years a shepherd, watched the stars at night like his predecessors of Chaldea, and like them was led away by his favorite planet to the contemplation of the goodness and magnificence of the works of Deity

William Gifford was bound out to a shoemaker, after having served for a number of years in a small cruiser as cabin boy. Being too poor to purchase stationery, he used to hammer out as smoothly as possible, small bits of leather, on which he traced problems with his awl. In latter years his critical awl pierced the souls of many luckless scribblers.

English Music in Spain.

The Lancashire bell-ringers, who, when in Paris, about two months ago, had the honor of performing before the king, and royal family at St, Cloud, made their appearance last week at the Grand Theatre of Barcelona, and were received by a crowded audience with a warmth even exceeding that which they experienced at Havana. The Spaniards appear to be delighted with this kind of music, but they were near being disappointed by a curious circumstance. When the bell-ringers reached the Spanish frontier from Paris, on their way to Barcelona, all their bells were seized, on the ground that the importation of bells is prohibited in Spain. In vain did they observe that these were the musical instruments, and not bells introduced to sell. They were obliged to go on without them, and to await the decision of the chief of the customs at Gerona, to whom the bells were sent. This functionary was for many days quite as opposed to allow the bells to pass as the custom-house officers of the frontier, and it was not until the British Cousul at Barcelona had sent an express to Gerona, with a strong remonstrance against the rigid interpretation of the law by the Spanish functionaries, that the bells were released.

Antique Strange Clock.

There is advertised in the Baltimore papers an Astronomical clock, reputed to be the one sent out to China one year preceding Lord McCartnay's embassy to regulate the clocks, &c., sent out by the embassy as presents to the Emperor; and was subsequently purchased by Captain William McKibbon, of the ship Phoenix, and brought from Canton, in 1821, and whose written testimonials can be seen with the clock, at William B. C. Rigg's, 126 South Front Street, Baltimore.

TO CORRESPONDENTS.

"R. J. of N. Y."—You had better make the calculations yourself, it will only be exercise for your mind. It is not exactly generous to exact labor from others without reward that we can do ourselves.

"S. W. of Mass."—Your model has been forwarded to Washington.

"G. R. C. of Ohio. —No patent will be granted for a mere change of application.—There must be a new combination, a new composition, or an entire new principle of construction.

"S. J. T. of Va."—Your State is yet destined to arise, Phœnix like, by an industrious developement of her natural resources. You have coal for manufacturing and plains for the finest of wheat—these are beds of gold. To find the diameter of a solid cast iron cylinder to support a given weight in the middle, multiply the weight in pounds by the length in feet and divide the product by 500, and the

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cube root of the quotient will be the diameter in inches.

" M. K. of La."—We have strong doubts as to the profitable application of Galvanism in the manufacture of sugar. A natural permanent battery of zinc and coke buried in the earth, does not satisfy us regarding economy. Experiment, however, is the grand settler of difference of opinion.

" S. M. P. of Mass."—The subject of Wood's Plough, and the action of Congress on the extension of the patent right, is the all absorbing topic among our farmers and plough manufacturers. We have received a number of communications on the subject. From what we have already said much light will be spread abroad.

" J. McK. of Mass."—See Edinburgh Encyclopedia, article " Centre of Percussion," and you will find that your plan is not new.

" H. B. of Indiana."—We have answered you by mail ; also R P. of Oneida Co. N. Y., D. W. of Vt , and C. L. of Conn.

" H. B. A. of Va."—We will publish the communication next week. We have no drawing in our possession of Mr. Parker's wheels, or we should be happy to comply with your request.

" J. P. K. of Cabotville."—We are much obliged to you for your information.

" H. T. of Mass."—At present we cannot give you the desired information about the Scaglioni, but if possible we shall get for you soon.

" J. C. of Geo."—We will comply with your request, and in the meantime will be collecting material.

" W. & P. of N. Y."—We expect your model in a short time.

" L. S. P. of Texas."—We cannot at present give you the desired information, but will in some future number.

" Z. G. W. of N. H."—Use the muriate of tin instead of alum, and you will perceive that your purples will be more brilliant and more permanent. Use it sparingly.

" P. S. of N. Y."—The best thing you can do is to get an engraving of your apparatus published in the Scientific American. It will be a thousand dollars benefit to you

" W. & T. of Pa."—See No. 3, vol. 2, Scientific American, for information on the Patent Laws.

" Messrs. L & G. of Troy, N. Y."—We have received you model all safe. It is a complete machine. The engraving will appear next week.

" J. H. C. of S. C."—We could not send you vol. 2 *bound*, but have forwarded the numbers in sheets.

Inducements to Inventors.

The publishers of the Scientific American purpose to issue an edition of over 20,000 copies of this paper on the 11th and 18th of March, and those persons who have new inventions they wish noticed, or engravings of such inserted, will find it to their interest to improve the above opportunity.

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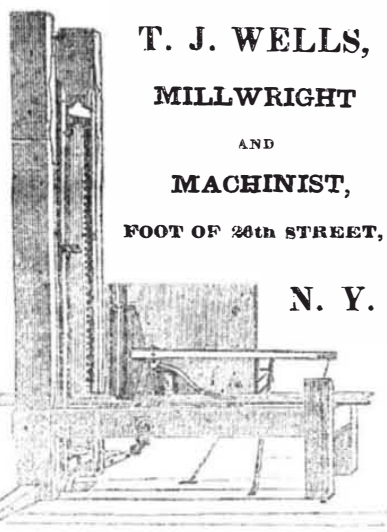

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FOR TUBULAR BOILERS,

From 1 1-4 to 6 inches diameter, and any length, not exceeding 17 feet.

THESE Tubes are of the same quality and manufacture as those extensively used in England, Scotland, France and Germany, for Locomotive, Marine and other Steam Engine Boilers.

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Augusta, Maine, Oct. 1, 1847. J. G. JOHNSON.

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THESE Machines have been extensively used the past season for driving the largest Threshing Machines and Separators in New York, Michigan and Wisconsin, and have exceeded the most sanguine expectations of all concerned in strength, durability, ease of operation, efficiency and cheapness. They received the highest premium at the Onondaga and Washington County Fairs, and the approbation of all who have seen them in use. It is, I think, perfectly obvious that no other arrangement with two pinions can ever be produced of equal simplicity and convenience by being permanently mounted and operating in any direction without unfastening from the ground and belting above the horses they are rendered so perfect that forty cords of heavy wood have been sawed twice in two in a day by four men and three horses.

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DANIEL WOODBURY.
Perkinsville, Vermont, Jan. 5, 1848. j22 6t*

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References.—Munn & Co. Scientific American, New York ; Kingsley & Pirrson, Eureka, New York ; W. H. Starr, Farmer & Mechanic, New York ; S. D. Nichols, Editor Sunday Mercury, New York ; Williamson & Burns. Sunday Dispatch, New York ; Edmund Morris, Editor Gazette, Burlington, N. J. ; J. B. & P. Kunkle, corner of Garden and Willow sts., Philadelphia ; John Hancock, Editor Mirror of Patent Office, Washington, D. C, d25 3m*

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Enamels.

YELLOW ENAMEL.—Take four parts of a flux, made of glass of lead one pound, pearl ashes 6 ounces, and borax four ounces, and mix with one part of antimony and the same of sulphuret of silver, made by putting plates of silver into a crucible with flowers of sulphur and submitting them to a red heat, and afterwards reducing it to powder. These should be mixed and vitrified together and afterwards levigated (ground fine) with one part of the salts of tin. It is then ready for enamel painting and makes a splendid opaque yellow. If six parts of the above flux be used with calcined silver two parts, and antimony half a part, and fluxed in a proper vessel till all are transparent and afterwards levigated, it makes a bright transparent yellow and the antimony can be omitted if greater transparency is wanted. If crocus (the sulphate of iron burnt in a crucible) be used instead of the antimony in the foregoing receipt, a very firm and clear cool yellow is the result, one fit for forming some kind of greens; or for a deep dull yellow omit the silver and add antimony, flux until perfectly vitrified and afterwards levigate with one part of the salts of tin, when it will be fit for use. It is a very good and strong yellow, and very cheap.

A yellow enamel verging towards orange, can be made with the above first mentioned flux fused until transparent with one part of crocus This enamel is valuable for brown mixtures and shading different yellows. Ochre used in fluxing is also a good and cheap substance for making yellows. Orpiment is also used for making yellows with the above flux, but it must not receive much heat.

BRIGHT OPAQUE GREEN.—Take of ultramarine, or cobalt, and the opaque yellow mixture, first described in this article, each one part, and of the flux first mentioned two parts, and just mix them well together, when they will be ready for painting. If the same flux be used in six parts, to one part of the precipitate of copper from a sulphate by an alkali, and fluxed together until they are transparent, a composition for a fine deep green enamel is the result. It can be made to any shade of lightness by using any quantity necessary of the transparent yellows previously described. If cobalt and a yellow made from crocus mixed with their proper fluxes, be levigated together, they make a fine mixture for a bright transparent enamel green.

If the first mentioned flux six parts, of ochre one part, and copper calcined to a purple color one part, be well fluxed together and afterwards ground fine with one part of the calx of tin, it makes a good composition for a cheap green. By the greater quantity of cobalt used so are these greens made dark, and light by adding the salts of tin or antimony in greater proportions to the lightness required.

If the precipitate of gold and calcined silver be used with their proper fluxes and mixed together, it makes a splendid bright orange enamel. Antimony used along with these red and yellow coloring substances in different proportions, will make all the different shades of orange.

Copper calcined to redness and red tartar or argil, one part each, with any of the fluxes mentioned, if fused together until they are transparent and no longer, and then levigated with an equal part of the glass of antimony, a very cheap orange composition for enameling is the result. Transparent purple and opaque purples are made by mixtures of the precipitate of gold along with cobalt or ultramarine and any of the fluxes mentioned. For the transparent purples the coloring matter is first vitrified with the fluxes and afterwards levigated for the painting, but for opaque purples the coloring matters are only well mixed with the fluxed at a medium heat and not vitrified. This is the difference between the two ways, transparent and opaque enamel colors.

BROWN ENAMELS.—By mixing any of the purples mentioned along with bright yellow and a very small portion of manganese and an equal part of calcined tin, a fine brown enamel is the result. They must be levigated for use. According as the browns are wanted on the yellow shade, more yellow is added. and for the red shade more red, for the dark blackish brown more manganese, and for the clear olive use ultramarine and yellow and a small portion of manganese. Light and dark shades can be made by adding a greater or less quantity of the calx of tin for lightness, and of the dark coloring matter for darkness.

BLACK ENAMEL.—Take of the flux first described six parts, of cobalt one part, of antimony one part, of scarlet ochre and magnesia each a fourth part, mix and fuse them together until they become a black of the deepest cast. If borax be used in a greater quantity, a softer enamel is the result. This composition is good for painting enamel dial plates or painting on china, or enamel grounds, in the manner of prints, or for light or shade, like India ink for water colors. By using with this the greater quantity of borax and arsenic, fine outward touches may be made on hard enamel grounds, as they will run with but little heat and show the finest shade without any danger of fusing a hard ground that has much flint or Venitian glass in its composition.

The fine colors on china, so dazzling and so truly beautiful, are all made of the foregoing compositions. Great skill is used and much practice required to do them well and much secrecy observed regarding the business — The source from whence the foregoing information is derived is rarely opened. M K.

Table of the Composition of Metallic Baths to Temper Edge Tools.

The tool, or tools, that are to be tempered, are laid on the surface of the metal of the fusible bath and heat is applied to melt the metal. When it melts the tools should be suddenly plunged into cold water, and thus acquire the desired temper.

Thermometers to test the following degrees of heat can be purchased at any Philosophical Instrument Maker's.

Articles.	*Baths, (parts.)*	*Temp Fah.*
Lancets : :	7 lead 4 tin	420°
Surgical Instruments,	7½ do 4 do	430
Razors, &c. , :	8 do 4 do	445
Penknives and Scalpels,	8½ do 4 do	460
Larger Penknives, &c.	10 do 4 do	470
Scissors, shears, garden hoes, cold chisels, &c.	14 do 4 do	490
Axes, plane irons, firmer chisels, penknives, &c.	19 do 4 do	509
Table knives, shears, &c.	30 do 4 do	530
Swords, watch-springs,	48 do 4 do	550
Daggers, augurs, small fine saws, &c. :	50 do 2 do	558
Pit saws, handsaws, &c.	Boiling lins. oil	600
Articles which require to be still somewhat softer	Melted lead	612

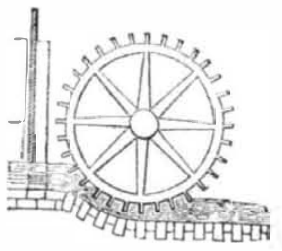
To Sweeten Rancid Butter.

The Echo Mode Sevant says;—"An agriculturist in the neighborhood of Brussels, Belgium, having succeeded in removing the bad smell and disagreeable taste from butter by beating or mixing in fresh water with choloride of lime, he was encouraged by this happy result to continue his experiments, by trying them on butter so rancid as to be past use; and he has restore to butter whose odor and taste were insupportable, all the sweetness of fresh. This operation is extremely simple and practicable to all; it consists in beating the butter in a sufficient quantity of water in which put 25 or 30 drops of chloride of lime to two pounds of butter. After having mixed it till all its parts are in contact with the water, it may be left in it for an hour or two, afterwards withdrawn and washed anew with fresh water. The chloride of lime having nothing injurious in it, can with safety be augmented; but after having verified the experiment, it was found that 25 or 30 drops to a killogramme of butter (two and a quurter pounds) were sufficient.

The mountains of Safra, in Arabia, produce the balm of Mecca, which in the early ages sold for its weight in gold.

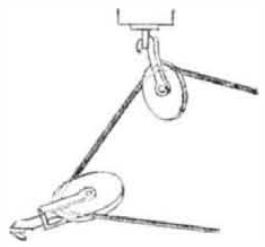
MECHANICAL MOVEMENTS.

Hydraulic Screw.



This cut represents an arrangement for working the Screw of Archimides for raising water. The shaft of this apparatus is hollow.—It is revolved by the wheel connected on the other side cog-wheels and a cross shaft to whirl round the spiral, which is represented as being in the hollow interior. The lower extremity of the hollow cylinder is immersed in the water and the screw laps up a portion of the water at every revolution ahd conveys it to the reservoir above.

The Pulley.



There are two kinds of pulleys, *fixed* and *moveable*. No power is derived from the fixed pulley except the advantages of changing the direction of power, being thereby the fulcrum to a flexible lever. From the moveable pulley power is gained, it operates as a lever of the second order. Thus, if one end of a rope be fixed to a stationary stud and the other end to a moveable power, the rope doubled and the ends parallel, the pulley that hangs between is a lever, the fixed end of the rope being the fulcrum and the other the moveable end of the lever, hence the power is double the distance from the fulcrum than is the weight hung at the pulley, and therefore the power is to the weight as two to one. This is all the advantage gained by one moveable pulley, for two, twice the advantage, for three thrice the advantage, and so on for every additional moveable pulley. An excellent work has been lately produced by Mr. Brady, Sailing Master, U. S. Navy, of Brooklyn, on the subject as applied to ships, which is allowed to be the best ever published. The above cut only represents the rope and block, not the principle of a problem.

RULE: Divide the weight to be raised by twice the number of moveable pulleys, and the quotient is the power required to raise the weight.

Researches at Ninevah and Nimrood.

At the ordinary meeting of the Royal Institute of Architects, London, on the 10th of January, Mr. Tite introduced Mr. Layard, who, in some remarks on his recent researches, stated that the date of the ruins discovered was still a mystery, but there could be no doubt of their extreme antiquity He would afford them one proof of it; the earliest buildings in Ninevah, were buried, and the earth which had accumulated over them has been used as a burial-place by a nation who lived 700 years before Christ. Probably the buildings dated from 1,200 years before Christ. The rooms were lined with slabs of marble covered with bas-reliefs, such as those now in the British Museum. which were joined together by double dove-tails of iron. The doorways were flanked by winged figures of greater height than the slabs; on all these figures was the mark of blood, as if thrown against them, and allowed to trickle down. The walls were of sun-dried bricks, and where these showed above the sculptured slabs, up to the ceiling, they were covered with plaster and painted. The beams where they remained were found to be of mulberry —That the slabs should have been preserved so long, puzzled many In truth, however, the bricks being simply dried in the sun, in falling had returned to the earth, and had thus buried the tablets and protected them The buildings, he said, were provided with a complete system of sewerage. Each room had a drain connected with a main sewer. Mr. Layard then proceeded to say that in the midst of the ruins he had discovered a main chamber, formed of bricks regularly arched The bas-reliefs sent over by him, were in many cases found in positions showing that they had been taken from other buildings and re-used, the sculptured face of the slab, for example, was turned to the wall, and the back re-worked.—*Builder*.

Gaudin's Night Sun.

The newly invented light of M. Gaudin, on which experiments were recently made in Paris, is an improved modification of the well known invention of Lieut. Drummond. While Drummond pours a stream of oxygen gas, through the spirits of wine upon unslacked lime, Caudin makes use of a more etherial kind of oxygen, which he conducts through burning essence of turpentine. The Drummond light is 1590 times stronger than that of burning gas; the Gaudin light is, we are assured by the inventor, as strong as the sun, or 30,000 times stronger than gas, and of course twenty times stronger than the Drummond.

The method by which M. Gaudin proposes to turn the new invention to use is singularly striking. He proposes to erect on the Island of Pont Neuf, in the middle of the Seine, and centre of Paris, a lighthouse five hundred feet high, in which is to be placed a light from a hundred thousand to a hundred millions of gas pipes strong, the power to be varied as the nights are light or dark. Paris will thus enjoy a sort of perpetual day, and as soon as the sun of heaven has set, the sun of Point Neuf will rise.

Testing Gold.

Much has recently been said in relation to gold coin being adulterated with silver, and difficulty of detecting the adulteration. It requires only a very simple method, one discovered by archimedes, to detect base coin. by weighing it in air, and in water dividing the weight in air by the loss of weight in water, and the presence of base metal will appear. Pure hammered gold has a specific gravity of 10 65-100, hammered silver 10 51-100, and hammered copper, 8 89-100. This test is infallible, but not so easy performed.

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